

otherwise required for sulfur dioxide and chlorine tank material. In chlorine cargo tanks, the wall thickness must be at least 1.59 cm (0.625 inch), including corrosion allowance.

(f) Where a cargo tank support is attached to any part of the cargo tank wall, the stresses imposed on the cargo tank wall must meet the requirements in paragraph (a) of this section.

(g) The design, construction, and installation of an attachment, appurtenance to the cargo tank, structural support member between the cargo tank and the vehicle or suspension component, or accident protection device must conform to the following requirements:

(1) Structural members, the suspension sub-frame, accident protection structures, and external circumferential reinforcement devices must be used as sites for attachment of appurtenances and other accessories to the cargo tank, when practicable.

(2) A lightweight attachment to the cargo tank wall such as a conduit clip, brake line clip, skirting structure, lamp mounting bracket, or placard holder must be of a construction having lesser strength than the cargo tank wall materials and may not be more than 72 percent of the thickness of the material to which it is attached. The lightweight attachment may be secured directly to the cargo tank wall if the device is designed and installed in such a manner that, if damaged, it will not affect the lading retention integrity of the tank. A lightweight attachment must be secured to the cargo tank shell or head by a continuous weld or in such a manner as to preclude formation of pockets which may become sites for corrosion. Attachments meeting the requirements of this paragraph are not authorized for cargo tanks constructed under part UHT in Section VIII of the ASME Code.

(3) Except as prescribed in paragraphs (g)(1) and (g)(2) of this section, the welding of any appurtenance to the cargo tank wall must be made by attachment of a mounting pad so that there will be no adverse effect upon the lading retention integrity of the cargo tank if any force less than that prescribed in paragraph (b)(1) of this section is applied from any direction. The

thickness of the mounting pad may not be less than that of the shell wall or head wall to which it is attached, and not more than 1.5 times the shell or head thickness. However, a pad with a minimum thickness of 0.25 inch may be used when the shell or head thickness is over 0.25 inch. If weep holes or tell-tale holes are used, the pad must be drilled or punched at the lowest point before it is welded to the tank. Each pad must—

(i) Be fabricated from material determined to be suitable for welding to both the cargo tank material and the material of the appurtenance or structural support member; a Design Certifying Engineer must make this determination considering chemical and physical properties of the materials and must specify filler material conforming to the requirements in Section VIII of the ASME Code (IBR, see §171.7 of this subchapter).

(ii) Be preformed to an inside radius no greater than the outside radius of the cargo tank at the attachment location.

(iii) Extend at least 2 inches in each direction from any point of attachment of an appurtenance or structural support member. This dimension may be measured from the center of the attached structural member.

(iv) Have rounded corners, or otherwise be shaped in a manner to minimize stress concentrations on the shell or head.

(v) Be attached by continuous fillet welding. Any fillet weld discontinuity may only be for the purpose of preventing an intersection between the fillet weld and a tank or jacket seam weld.

[Amdt. 178-89, 55 FR 37056, Sept. 7, 1990, as amended by Amdt. 178-104, 59 FR 49135, Sept. 26, 1994; Amdt. 178-105, 60 FR 17401, Apr. 5, 1995; Amdt. 178-118, 61 FR 51340, Oct. 1, 1996; 65 FR 58631, Sept. 29, 2000; 68 FR 19279, Apr. 18, 2003; 68 FR 52370, Sept. 3, 2003; 68 FR 75753, Dec. 31, 2003]

#### § 178.337-4 Joints.

(a) Joints shall be as required in Section VIII of the ASME Code (IBR, see §171.7 of this subchapter), with all undercutting in shell and head material repaired as specified therein.

(b) Welding procedure and welder performance must be in accordance with Section IX of the ASME Code. In addition to the essential variables named therein, the following must be considered as essential variables: Number of passes; thickness of plate; heat input per pass; and manufacturer's identification of rod and flux. When fabrication is done in accordance with part UHT in Section VIII of the ASME Code, filler material containing more than 0.08 percent vanadium must not be used. The number of passes, thickness of plate, and heat input per pass may not vary more than 25 percent from the procedure or welder qualifications. Records of the qualifications must be retained for at least 5 years by the cargo tank manufacturer and must be made available to duly identified representatives of the Department and the owner of the cargo tank.

(c) All longitudinal shell welds shall be located in the upper half of the cargo tank.

(d) Edge preparation of shell and head components may be by machine heat processes, provided such surfaces are remelted in the subsequent welding process. Where there will be no subsequent remelting of the prepared surface as in a tapered section, the final 0.050 inch of material shall be removed by mechanical means.

(e) The maximum tolerance for misalignment and butting up shall be in accordance with the requirement in Section VIII of the ASME Code.

(f) Substructures shall be properly fitted before attachment, and the welding sequence shall be such as to minimize stresses due to shrinkage of welds.

[Order 59-B, 30 FR 580, Jan. 16, 1965. Redesignated at 32 FR 5606, Apr. 5, 1967]

EDITORIAL NOTE: For FEDERAL REGISTER citations affecting § 178.337-4, see the List of CFR Sections Affected which appears in the Finding Aids section of the printed volume and on GPO Access.

**§ 178.337-5 Bulkheads, baffles and ring stiffeners.**

- (a) Not a specification requirement.
- (b) [Reserved]

[Order 59-B, 30 FR 580, Jan. 16, 1965. Redesignated at 32 FR 5606, Apr. 5, 1967]

**§ 178.337-6 Closure for manhole.**

(a) Each cargo tank marked or certified after April 21, 1994, must be provided with a manhole conforming to paragraph UG-46(g)(1) and other applicable requirements in Section VIII of the ASME Code (IBR, see § 171.7 of this subchapter), except that a cargo tank constructed of NQT steel having a capacity of 3,500 water gallons or less may be provided with an inspection opening conforming to paragraph UG-46 and other applicable requirements of the ASME Code instead of a manhole.

(b) The manhole assembly of cargo tanks constructed after June 30, 1979, may not be located on the front head of the cargo tank.

[Amdt. 178-7, 34 FR 18250, Nov. 14, 1969, as amended by Amdt. 178-52, 43 FR 58820, Dec. 18, 1978; Amdt. 178-89, 54 FR 25017, June 12, 1989; 55 FR 21038, May 22, 1990; 56 FR 27876, June 17, 1991; 58 FR 12905, March 8, 1993; Amdt. 178-118, 61 FR 51340, Oct. 1, 1996; 68 FR 75753, Dec. 31, 2003]

**§ 178.337-7 Overturn protection.**

- (a) See § 178.337-10.
- (b) [Reserved]

[Order 59-B, 30 FR 580, Jan. 16, 1965. Redesignated at 32 FR 5606, Apr. 5, 1967]

**§ 178.337-8 Openings, inlets, and outlets.**

(a) *General.* The requirements in this paragraph (a) apply to MC 331 cargo tanks except for those used to transport chlorine. The requirements for inlets and outlets on chlorine cargo tanks are in paragraph (b) of this section.

(1) An opening must be provided on each cargo tank used for the transportation of liquefied materials to permit complete drainage.

(2) Except for gauging devices, thermometer wells, pressure relief valves, manhole openings, product inlet openings, and product discharge openings, each opening in a cargo tank must be closed with a plug, cap, or bolted flange.

(3) Except as provided in paragraph (b) of this section, each product inlet opening, including vapor return lines, must be fitted with a back flow check valve or an internal self-closing stop valve located inside the cargo tank or